(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 1 480 475 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
01.02.2012 Bulletin 2012/05

(51) Int Cl.:
H04W 88/12 *(2009.01)*

(21) Application number: **04011962.0**

(22) Date of filing: **19.05.2004**

(54) **Radio network controller and broadcast information transmission method**

Funknetzsteuerungseinheit und Verfahren zur Rundsendeinformationsübertragung

Contrôleur de réseau radio et procédé de radiodiffusion

(84) Designated Contracting States:
DE FR GB IT

(30) Priority: **21.05.2003 JP 2003143919**

(43) Date of publication of application:
24.11.2004 Bulletin 2004/48

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US-A- 5 678 181

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Printed by Jouve, 75001 PARIS (FR)

Description

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates to a radio network controller for controlling the broadcast timing when various kinds or broadcast information is broadcast with respect to each of two mobile communication systems, which reside in the same frequency band of the same area and have common specification for physical layer in a state where all or a part of upper layer protocols have no compatibility, and relates to a broadcast information transmission method in the radio network controller.

Related Background Art

[0002] Conventionally, in a DS-CDMA mobile communication system, a switching center for connecting with other networks is connected to a plurality of radio network controllers, each radio network controller controls a plurality of base stations, and each base station administers a plurality of cells or a plurality of clusters. In each cell or each cluster, various kinds of information such as information, which is necessary for a mobile station within the area to camp on, and information, which is effective after connection, is broadcast periodically (refer to the document "3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Radio Resource Control (RRC) protocol specification (Release 1999)"). The above-mentioned information is prepared in the radio network controller and transmitted to the mobile station via the base station.

[0003] Fig. 1 shows an example of broadcast information according to a conventional method. In each broadcast information, a region for notifying at what timing various kinds of information is broadcast, is fixedly set as shown with region A in Fig. 1, and the above timing information is notified using the fixed region A. The mobile station acquires the broadcast information in a cell or cluster that it is attempting to camp on, by acquiring the timing information given in region A. The information given in region A includes the exact timing when each kinds of broadcast information is sent (as shown by time pointer information indicated with the arrows in Fig. 1).

EP 0 928 119 A2 discloses transmission of control information from a base station to at least one mobile station using a first channel and a second channel. At a first moment of time, there is an indication on the first channel about the location of the piece of control information on the second channel, and at a second moment of time, later that said first moment, the piece of control information is transmitted on the second channel.

SUMMARY OF THE INVENTION

[0004] However, when a plurality of mobile communication systems reside in the same band of the same area, and when these systems have common specification for physical layer, but have little compatibility in upper layer, there is a possibility that these mobile communication systems interfere with each other until dedicated resources are allocated to the mobile stations, and the both can not be coexistent with each other depending on the type of other compatibility.

[0005] Also, even when the interference can be prevented before the dedicated resources are allocated to the mobile stations by some methods, since the broadcast information is transmitted in a manner of time division multiplex based on each mobile communication system, when the amount of information of the broadcast information is large, it may cause such problem as increase in connection delay resulting in a decreased efficiency of information transmission in the mobile communication system.

[0006] The present invention has been achieved to solve the above-described problems. An obj ect of the present invention is to provide a radio network controller and a broadcast information transmission method, which are capable of allowing two mobile communication systems residing in the same area and same frequency band to be coexistent compatibly with each other while reducing the mutual interference.

[0007] In order to achieve the above-mentioned object, a radio network controller according to the present invention is a radio network controller for controlling the broadcast timing when various kinds of broadcast information is broadcast with respect to each of two mobile communication systems, which reside in the same frequency band of the same area and have common specification for physical layer in a state where all or a part of upper layer protocols have no compatibility, comprises a control unit that controls to broadcast various kinds of broadcast information about one mobile communication system at a predetermined timing; with respect to various kinds of broadcast information about the other mobile communication system, to notify broadcast timing information, which is scheduled to be staggered from the broadcast timing of the one mobile communication system, using a predeterimined region of broadcast information from a piece of broadcast information, and to broadcast the broadcast information of the other mobile communication system at the notified broadcast timing.

[0008] Also, a broadcast information transmission method according to the present invention is a broadcast information transmission method, in a radio network controller for controlling the broadcast timing when various kinds of broadcast information is broadcast with respect to each of two mobile communication systems, which reside in the same frequency band of the same area and have common specification for physical layer in a state where all or a part of upper layer protocols have no compatibility, comprises the steps of broadcasting various kinds of broadcast information about one mobile communication system at a predetermined timing; with re-

spect to various kinds of broadcast information about the other mobile communication system, notifying broadcast timing information, which is scheduled to be staggered from the broadcast timing of the one mobile communication system, using a predetermined region of broadcast information from a piece of broadcast information, broadcasting the broadcast information of the other mobile communication system at the notified broadcast timing.

[0009] According to the present invention, in a radio network controller for controlling the broadcast timing when various kinds of broadcast information is broadcast with respect to each of two mobile communication systems, which reside in the same frequency band of the same area and have common specification for physical layer in a state where all or a part of upper layer protocols have no compatibility; and various kinds of broadcast information about one mobile communication system is broadcast at a predetermined timing. With respect to various kinds of broadcast information about the other mobile communication system, broadcast timing information, which is scheduled to be staggered from the broadcast timing of the one mobile communication system, is notified using a predetermined region of broadcast information from a piece of broadcast information, and the broadcast information of the other mobile communication system is broadcast at the notified broadcast timing.

[0010] As described above, by broadcasting broadcast information about one mobile communication system at a predetermined timing, it is easy to schedule the broadcast timing of the broadcast information about the other mobile communication system being staggered from the broadcast timing of the above one mobile communication system. Since the broadcast information of the other mobile communication system is broadcast at the notified broadcast timing, which is scheduled to be staggered therefrom, it is possible to suppress the mutual interference between two mobile communication systems. Further, what is notified using a predetermined region of broadcast information from a piece of broadcast information in the broadcast information is the broadcast timing information of the other mobile communication system only. Accordingly, even when the amount of information of the broadcast information is large, it is possible to prevent such problem as increase in connection delay, or the like; thus, it is possible to prevent the transmission efficiency of information in the mobile communication system from decreasing.

[0011] Therefore, according to the present invention, two mobile communication systems residing in the same area and same frequency band are allowed to be coexistent compatibly with each other while preventing the mutual interference.

[0012] The above-mentioned control unit is preferably arranged so as to perform both or either of dividing of broadcast information and alteration of the broadcast period of the broadcast information in accordance with the priority of the broadcast information. Likewise, the above-mentioned broadcast information transmission method also is preferably arranged so as to perform both or either of dividing of broadcast information and alteration of the broadcast period of the broadcast information in accordance with the priority of the broadcast information.

[0013] In these cases, the repetition period of the transmission can be controlled in accordance with the priority of the broadcast information as well as an appropriate broadcast information transmission control can be carried out in accordance with the priority of the broadcast information.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] Fig. 1 is a view showing an example of broadcast information in accordance with a conventional method.

[0015] Fig. 2 is a view showing a configuration of DS-CDMA system in accordance with an embodiment of the invention.

[0016] Fig. 3 is a view showing component elements relevant to the present invention.

[0017] Fig. 4 is a flowchart showing broadcast information transmission processing in a radio network controller.

[0018] Fig. 5 is a flowchart showing combining processing in a broadcast information combining processing section in the radio network controller.

[0019] Fig. 6 is a view showing an example of broadcast information after the combining processing.

[0020] Fig. 7 is a flowchart showing broadcast information reception processing in a mobile station, which supports system 1.

[0021] Fig. 8 is a flowchart showing broadcast information reception processing in a mobile station, which supports system 2.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0022] Hereinafter, an embodiment of a radio network controller and a broadcast information transmission method in accordance with the present invention will be described.

[0023] Fig. 2 shows an example of a configuration of a DS-CDMA system. As shown in Fig. 2, the system comprises a switching center 10, a radio network controller 20 and a base station 30, which are structured in a hierarchical fashion. That is, the switching center 10 for connecting with other networks is connected to a plurality of radio network controllers 20, and each radio network controller 20 controls a plurality of base stations 30. Each base station 30 administers a plurality of cells 40 (or plurality of clusters).

[0024] In this embodiment, it is assumed that there are two mobile communication systems, which reside in the same frequency band in the same area and have common specification for physical layer in a state where all or a part of upper layer protocols have no compatibility.

The switching center 10, the radio network controllers 20 and the base stations 30 in Fig. 2 support both of the two mobile communication systems. Also, the mobile stations residing in the area of each cell 40 (or each cluster) support either one system in the above two mobile communication systems, and periodically receive various kinds of broadcast information such as information, which is necessary for waiting, and information, which is effective after connection. Various kinds of broadcast information about each mobile communication system is prepared in the radio network controllers 20, and is broadcast to the mobile stations via the base stations 30. Hereinafter, the two mobile communication systems will be referred to as system 1 and system 2 respectively.

[0025] Fig. 3 shows component elements relevant to the present invention. As shown in Fig. 3, the radio network controller 20 comprises a system 1 broadcast information preparing section 21 that prepares broadcast information for the system 1, a system 2 broadcast information preparing section 22 that prepares broadcast information for the system 2, and a broadcast information combining processing section 23 that combines broadcast information for the system 1 and broadcast information for the system 2. The base station 30 is equipped with a periodic broadcast processing section 31 that periodically and faithfully transmits broadcast information prepared by the radio network controller 20 in accordance with the instruction given by the radio network controller 20.

[0026] A mobile station 60 that supports the system 2 (hereinafter, referred to as "mobile station for system 2") is equipped with a broadcast information acquisition processing section 61 that acquires the broadcast information and a plurality of various kinds of information processing sections 62 that performs processing of various kinds of information broadcast by the broadcast information. On the other hand, a mobile station 50 that supports the system 1 (hereinafter, referred to as "mobiie station for system 1") is equipped with, in addition to a broadcast information acquisition processing section 51 and a plurality of various kinds of information processing sections 52, which are the same as the above, a fixed schedule storing section 53 that fixedly stores the timing information by which various kinds of information about the system 1 is broadcast.

[0027] Also, a fixed schedule storing section 23A that stores broadcast timing information, which is the same as the broadcast timing information about the system 1 stored in the above-mentioned fixed schedule storing section 53, is provided in the broadcast information combining processing section 23 of the radio network controller 20.

[0028] The processing operation in the present embodiment will be described below.

[0029] In the first place, there will be described the processing operation of the radio network controller 20 while using Figs. 4, 5. The radio network controller 20 prepares broadcast information for the system 1 and broadcast information for the system 2 separately (S01 and S02 in Fig. 4). In the next S03, the broadcast information combining processing section 23 performs combining processing, which will be described later (Fig. 5), and then transfers the combined broadcast information to the base station 30 (S04).

[0030] Here, referring to Fig. 5, the combining processing will be described. First, in S11, the broadcast information combining processing section 23 takes out broadcast information of a predetermined amount of data from the broadcast information to be combined, and checks the priority of content of the broadcast information. For example, information necessary for connecting swiftly (information of common channel used at transmitting, information about access restriction, information of which content is to be frequently altered or the like) is determined as information with high priority; information such as peripheral area information and information about GPS function etc, which is unnecessary depending on the capability of the mobile station, is determined as information with low priority.

[0031] In 512, based on the result of the content check of the broadcast information, the broadcast information is determined whether the information has high priority or not. When the broadcast information is not information with high priority (when it is information with low priority), in S13, the broadcast information is divided into a plurality of (for example, two) groups of information. When the broadcast information is the information with high priority, the broadcast information is not divided.

[0032] In S14, a fragment, in which the broadcast information with high priority and a part of the divided broadcast information with low priority are combined with each other, is prepared, and the other part of the divided broadcast information with low priority is temporarily stored. In S15, the fragment prepared in S14 is broadcast alternately to each system, and based on system 1 broadcast timing information in the fixed schedule storing section 23A, a broadcast schedule is created so that broadcast timing of the system 1 broadcast information agrees with the system 1 broadcast timing. The following embodiment may be adopted; i.e., external data about the schedule of the system 2 broadcast information (for example, broadcast period of the system 2 broadcast information and intervals of fragments in the above-mentioned fragment preparation, etc) is set by a user (an administrator), and the broadcast information combining processing section 23 creates broadcast schedule in accordance with the external data.

[0033] After that, in S16, the processing S11 to S15 is repeated on the remaining broadcast information to be broadcast until it is determined that the processing S11 to S15 has been completed on entire broadcast information. Owing to the combining processing as described above, as shown in Fig. 6, the broadcast information is broadcast alternately between the systems 1 and 2. And in each system, at a certain timing, a piece or information with high priority and a half of a piece of information with

low priority are broadcast, and at the next timing in the relevant system, a piece of information with high priority and the rest of the information with low priority are broadcast. Owing to this, the swiftness of the transmission can be controlled in accordance with the priority of the broadcast information; thus, appropriate broadcast information transmission control in accordance with the priority of the broadcast information can be carried out. Also, the broadcast timing of the systems 1 and 2 can be scheduled to be staggered from each other. The broadcast information combining processing section 23, which performs the above-described processing, is equivalent to the control unit according to the present invention. The arrow in Fig. 6 indicates information (time pointer information) at what timing the broadcast information to the system 2 is broadcast.

[0034] Next, the operation of the base station 30 will be described. The base station 30 simply transmits the broadcast information created by the radio network controller 20 periodically in accordance with the instruction given by the radio network controller 20 through the periodic broadcast processing section 31.

[0035] Next, referring to Fig. 7 and Fig. 8, the operation of the mobile station will be described. As shown in Fig. 7, in the mobile station 50 for system 1, the broadcast information acquisition processing section 51 acquires broadcast timing information of the broadcast information from the fixed schedule storing section 53 (S21), receives broadcast information of the system 1 at the broadcast timing to acquire various kinds of information from the acquired broadcast information (S22), and transfers the acquired various kinds of information to the various kinds of information processing section 52 (S23). The various kinds of information processing section 52 perform a predetermined processing on the transferred various kinds of information (S24).

[0036] On the other hand, in the mobile station 60 for system 2, the broadcast information acquisition processing section 61 acquires broadcast timing information included in a predetermined region (for example, region A in Fig. 6) of broadcast information from a piece of broadcast information (S31), receives broadcast information of the system 2 at the broadcast timing to acquire various kinds of information from the acquired broadcast information (S32), and transfers acquired various kinds of information to the various kinds of information processing section 52 (S33). The various kinds of information processing section 62 performs a predetermined processing on the transferred various kinds of information (S34).

[0037] As described, the mobile station 50 for system 1, at a previously stored broadcast timing; while the mobile station 60 for system 2, at a broadcast timing, which is scheduled to be staggered from the broadcast timing of the system 1 set in a predetermined region (for example region A in Fig. 6) of the broadcast information, can receive broadcast information of the respective systems, and acquire various kinds of information from the broadcast information.

[0038] Owing to this, according to the above-described embodiment, it is possible to prevent mutual interference between two systems; and what is notified by a part of region of the broadcast information is the broadcast timing information of the system 2 only. Accordingly, even when the amount of the information of the broadcast information is large, it is made possible to prevent such problem as increase in connection delay, and to prevent the transmission efficiency of the information from decreasing in each system. Thus, it is possible to allow two systems residing in the same area and same frequency band to be coexistent compatibly with each other while reducing the mutual interference.

[0039] As described above, according to the present invention, broadcast information about one mobile communication system is broadcast at a predetermined timing. Thereby, the broadcast timing of the broadcast information about the other mobile communication system can be easily scheduled to be staggered from the broadcast timing of the above one mobile communication system. The broadcast information of the other mobile communication system is broadcast in accordance with the broadcast timing, which is scheduled to be staggered therefrom and notified. Accordingly, mutual interference between two mobile communication systems can be suppressed. Further, what is notified by a part of region of the broadcast information is the broadcast timing information only of the other mobile communication system. Accordingly, even when the amount of information of the broadcast information is large, it is possible to prevent such problem as increase in connection delay; and to prevent the transmission efficiency of the information from decreasing. Thus, it is possible to allow two systems residing in the same area and same frequency band to be coexistent compatibly with each other while reducing the mutual interference.

Claims

1. A radio network controller (20) for controlling the broadcast timing when various kinds of broadcast information is broadcast with respect to each of two mobile communication systems, which reside in the same frequency band of the same area and have common specification for physical layer in a state where all or a part of upper layer protocols have no compatibility, comprising:

   a control unit (23) adapted to control to broadcast various kinds of broadcast information about one mobile communication system at a predetermined timing; while the control unit (23) controls, with respect to various kinds of broadcast information about the other mobile communication system, to notify broadcast timing information, which is scheduled to be staggered from

the broadcast timing of said one mobile communication system, using a predetermined region of broadcast information from a piece of broadcast information, and to broadcast the broadcast information of the other mobile communication system at the notified broadcast timing.

2. The radio network controller (20) according to claim 1, wherein said control unit (23) is adapted to perform both or either of dividing of broadcast information and alteration of the broadcast period of the broadcast information in accordance with the priority of the broadcast information.

3. A broadcast information transmission method, in a radio network controller (20) for controlling the broadcast timing when various kinds of broadcast information is broadcast with respect to each of two mobile communication systems, which reside in the same frequency band of the same area and have common specification for physical layer in a state where all or a part of upper layer protocols have no compatibility, comprising the steps of:

broadcasting (S04) various kinds of broadcast information about one mobile communication system at a predetermined timing;
notifying (S04) broadcast timing information, which is scheduled to be staggered from the broadcast timing of said one mobile communication system, using a predetermined region of broadcast information from a piece of broadcast information, with respect to various kinds of broadcast information about the other mobile communication system; and
broadcasting (S04) the broadcast information of the other mobile communication system at the notified broadcast timing.

Patentansprüche

1. Funknetzwerksteuerung (20) zum Steuern der Rundsendeterminierung wenn verschiedene Arten von Rundsendeinformation rundgesendet werden bezüglich jedes von zwei Mobilkommunikationssystemen, welche in dem gleichen Frequenzband des gleichen Bereichs angesiedelt sind und gemeinsame Spezifikation für physikalische Schicht haben, in einem Zustand, wo alle oder ein Teil von Oberen-Schicht-Protokollen keine Kompatibilität haben, aufweisend:

eine Steuereinheit (23), eingerichtet zum Steuern zum Rundsenden von verschiedenen Arten von Rundsendeinformation über ein Mobilkommunikationssystem zu einer vorgegebenen Terminierung; während die Steuereinheit (23) steuert, bezüglich verschiedener Arten von Rundsendeinformation über das andere Mobilkommunikationssystem, zum Benachrichtigen über Rundsendeterminierungsinformation, welche terminiert ist, von der Rundsendeterminierung des einen Mobilkommunikationssystem versetzt zu sein, unter Verwendung einer vorgegebenen Region von Rundsendeinformation von einem Stück von Rundsendeinformation, und zum Rundsenden der Rundsendeinformation des anderen Mobilkommunikationssystems zu der benachrichtigten Rundsendeterminierung.

2. Funknetzwerksteuerung (20) gemäß Anspruch 1, wobei die Steuereinheit (23) eingerichtet ist zum Durchführen von beidem oder einem von Teilen von Rundsendeinformation und Änderung der Rundsendeperiode der Rundsendeinformation gemäß der Priorität der Rundsendeinformation.

3. Rundsendeinformationübertragungsverfahren in einer Funknetzwerksteuerung (20) zum Steuern der Rundsendeterminierung wenn verschiedene Arten von Rundsendeinformation rundgesendet werden bezüglich jedes von zwei Mobilkommunikationssystemen, welche in dem gleichen Frequenzband des gleichen Bereichs angesiedelt sind und gemeinsame Spezifikation für physikalische Schicht haben, in einem Zustand, wo alle oder ein Teil von Oberen-Schicht-Protokollen keine Kompatibilität haben, aufweisend die Schritte von:

Rundsenden (S04) von verschiedenen Arten von Rundsendeinformation über ein Mobilkommunikationssystem zu einer vorgegebenen Terminierung;
Benachrichtigen (S04) über Rundsendeterminierungsinformation, welche terminiert ist, von der Rundsendeterminierung des einen Mobilkommunikationssystem versetzt zu sein, unter Verwendung einer vorgegebenen Region von Rundsendeinformation von einem Stück von Rundsendeinformation, bezüglich verschiedener Arten von Rundsendeinformation über das andere Mobilkommunikationssystem; und
Rundsenden (S04) der Rundsendeinformation des anderen Mobilkommunikationssystems zu der benachrichtigten Rundsendeterminierung.

Revendications

1. Contrôleur de réseau radio (20) destiné à commander la synchronisation de diffusion lorsque divers genres d'informations de diffusion sont diffusées en ce qui concerne chacun de deux systèmes de communication mobile, qui se situent dans la même bande de fréquences de la même zone et qui présentent

des spécifications communes de la couche physique dans un état où tous les protocoles de la couche supérieure, ou une partie de ceux-ci, ne présentent aucune compatibilité, comprenant :

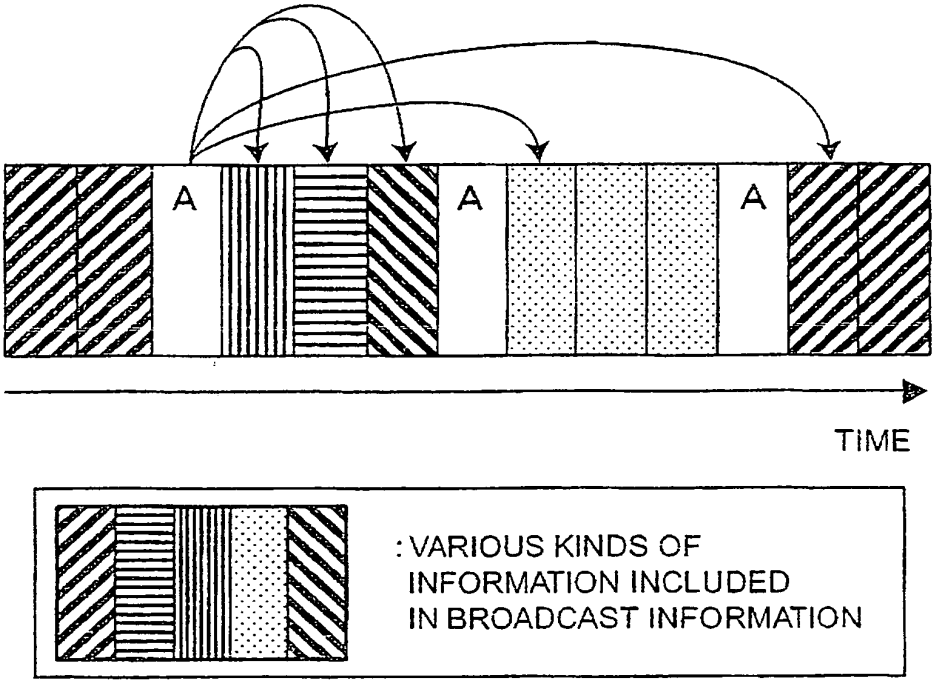
une unité de commande (23) adaptée de façon à commander la diffusion de divers genres d'informations de diffusion qui concernent un premier système de communication mobile à un minutage prédéterminé ; tandis que l'unité de commande (23) commande, en ce qui concerne divers genres d'informations de diffusion qui concernent le second système de communication mobile, la notification d'informations de minutage de diffusion, qui est planifié pour être décalé du minutage de diffusion dudit premier système de communication mobile, en utilisant une région prédéterminée des informations de diffusion à partir d'une partie des informations de diffusion, et la diffusion des informations de diffusion du second système de communication mobile au minutage de diffusion notifié.

2. Contrôleur de réseau radio (20) selon la revendication 1, dans lequel ladite unité de commande (23) est adaptée de façon à exécuter une division des informations de diffusion et / ou une modification de la période de diffusion des informations de diffusion selon la priorité des informations de diffusion.

3. Procédé de transmission d'informations de diffusion, dans un contrôleur de réseau radio (20) destiné à commander la synchronisation de diffusion lorsque divers genres d'informations de diffusion sont diffusées en ce qui concerne chacun de deux systèmes de communication mobile, qui se situent dans la même bande de fréquences de la même zone et qui présentent des spécifications communes de la couche physique dans un état où tous les protocoles de la couche supérieure, ou une partie de ceux-ci, ne présentent aucune compatibilité, comprenant les étapes consistant à :

diffuser (S04) divers genres d'informations de diffusion qui concernent un premier système de communication mobile à un minutage prédéterminé ;
notifer (S04) les informations de minutage de diffusion, qui est planifié pour être décalé du minutage de diffusion dudit premier système de communication mobile, en utilisant une région prédéterminée des informations de diffusion en provenance d'une partie des informations de diffusion, en ce qui concerne divers genres d'informations de diffusion qui concernent le second système de communication mobile ; et
diffuser (S04) les informations de diffusion du second système de communication mobile au minutage de diffusion planifié.

Fig.1


A
A
A
TIME
: VARIOUS KINDS OF
INFORMATION INCLUDED
IN BROADCAST INFORMATION

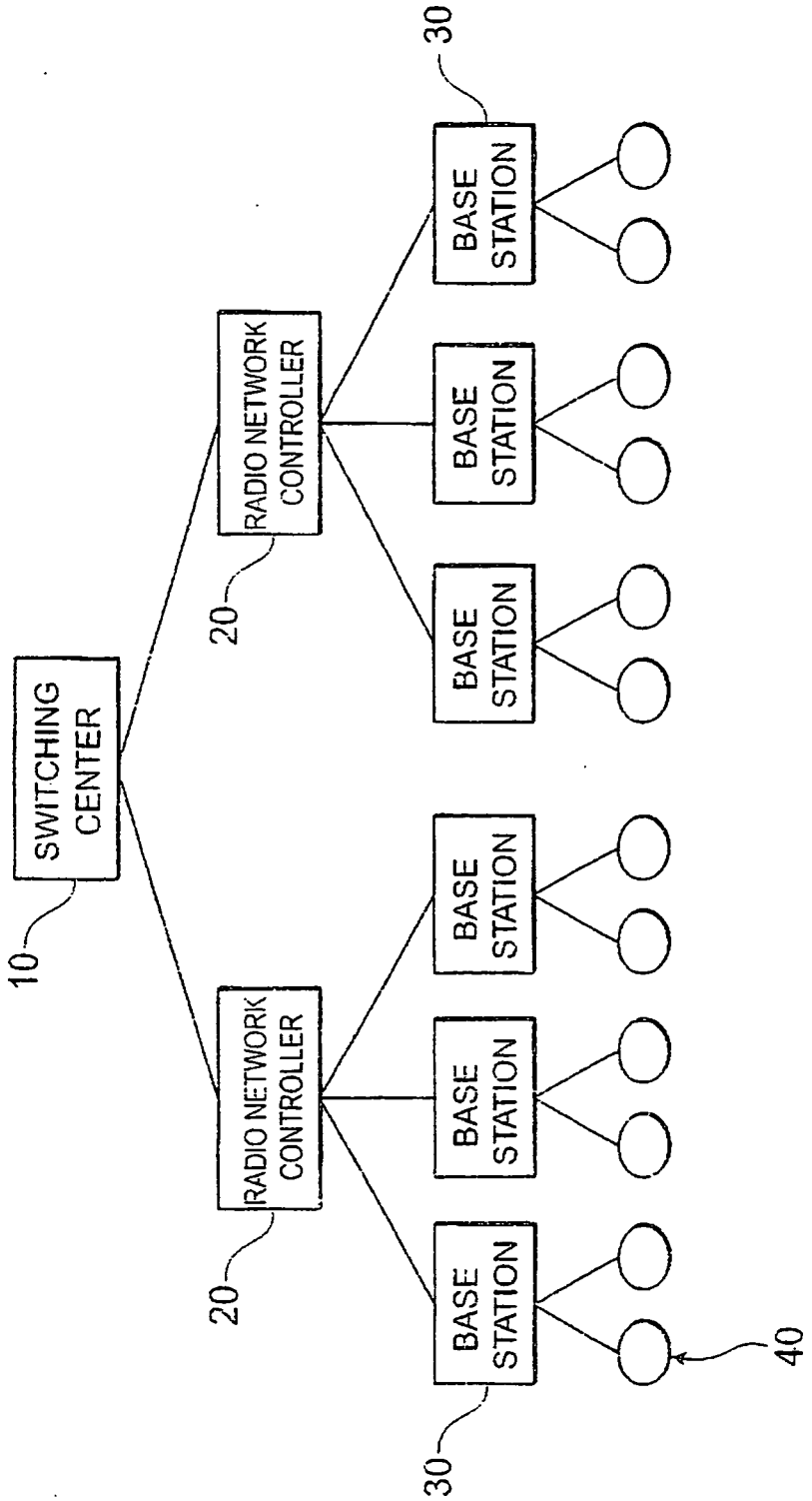

SWITCHING CENTER
10
RADIO NETWORK CONTROLLER
20
RADIO NETWORK CONTROLLER
20
BASE STATION
30
BASE STATION
BASE STATION
BASE STATION
BASE STATION
BASE STATION
30
40

Fig. 2

Fig.3

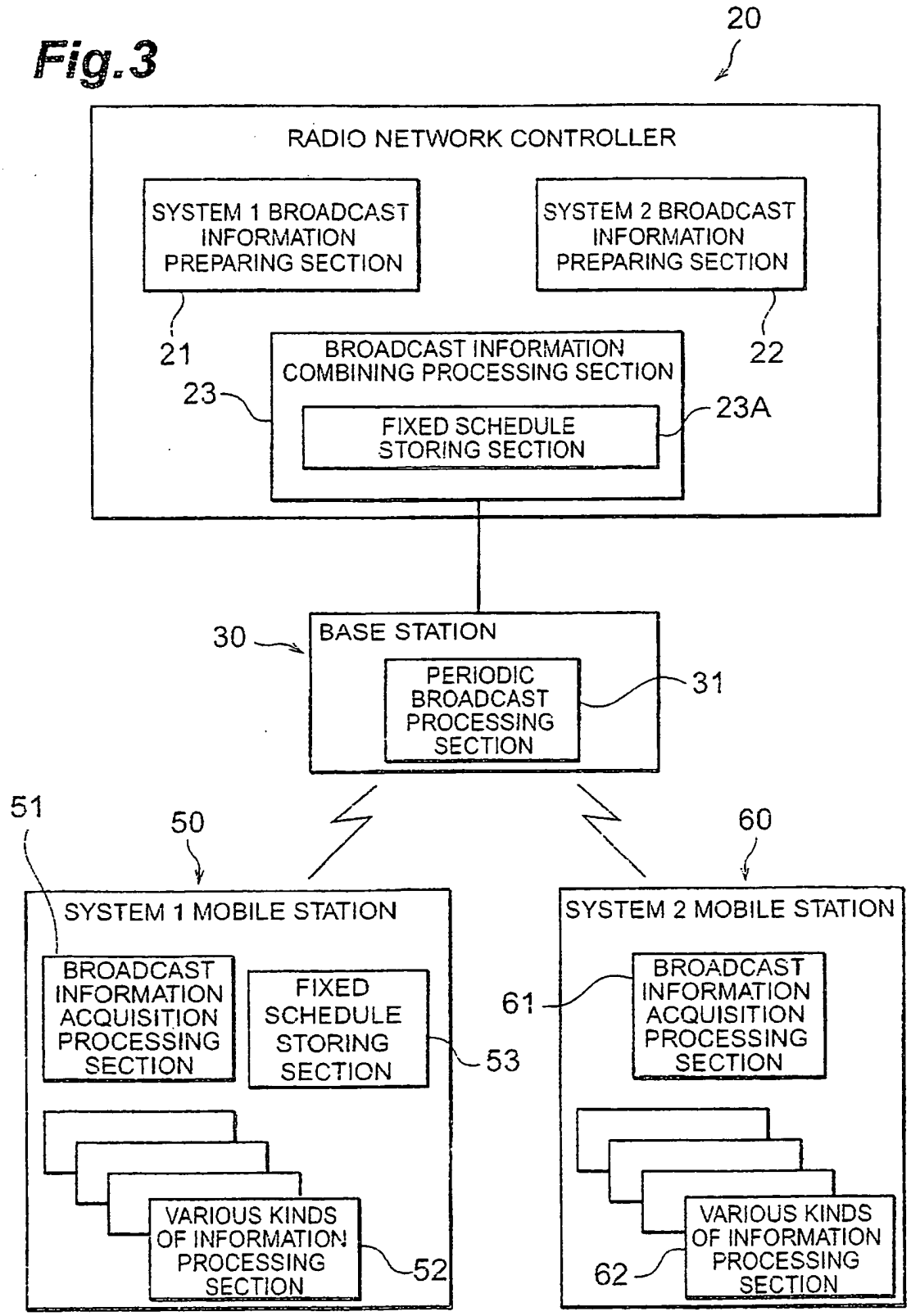

20
RADIO NETWORK CONTROLLER
SYSTEM 1 BROADCAST INFORMATION PREPARING SECTION
SYSTEM 2 BROADCAST INFORMATION PREPARING SECTION
21
22
BROADCAST INFORMATION COMBINING PROCESSING SECTION
23
23A
FIXED SCHEDULE STORING SECTION
30
BASE STATION
PERIODIC BROADCAST PROCESSING SECTION
31
51
50
60
SYSTEM 1 MOBILE STATION
SYSTEM 2 MOBILE STATION
BROADCAST INFORMATION ACQUISITION PROCESSING SECTION
FIXED SCHEDULE STORING SECTION
53
61
BROADCAST INFORMATION ACQUISITION PROCESSING SECTION
VARIOUS KINDS OF INFORMATION PROCESSING SECTION
52
62
VARIOUS KINDS OF INFORMATION PROCESSING SECTION

Fig.4

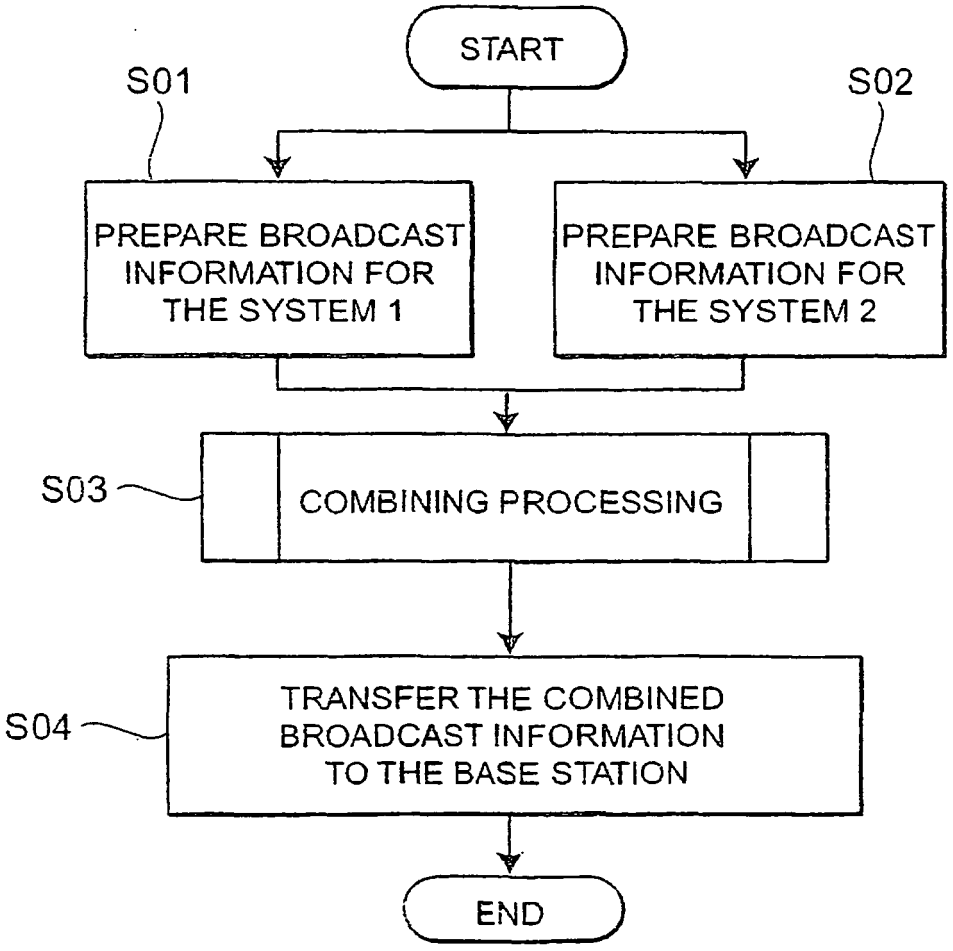
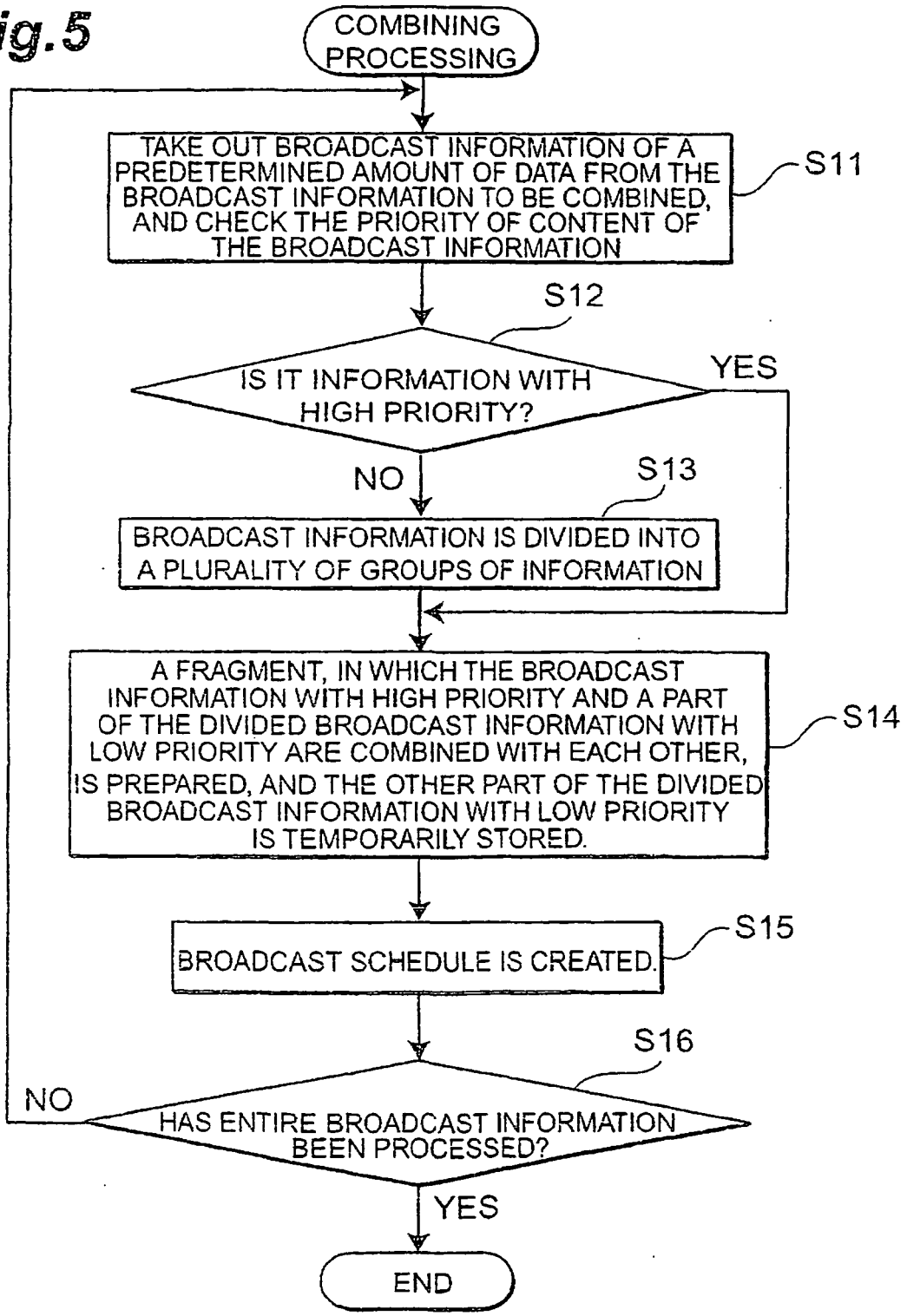

START
S01
S02
PREPARE BROADCAST INFORMATION FOR THE SYSTEM 1
PREPARE BROADCAST INFORMATION FOR THE SYSTEM 2
S03
COMBINING PROCESSING
S04
TRANSFER THE COMBINED BROADCAST INFORMATION TO THE BASE STATION
END

Fig.5


COMBINING PROCESSING
TAKE OUT BROADCAST INFORMATION OF A PREDETERMINED AMOUNT OF DATA FROM THE BROADCAST INFORMATION TO BE COMBINED, AND CHECK THE PRIORITY OF CONTENT OF THE BROADCAST INFORMATION
S11
S12
IS IT INFORMATION WITH HIGH PRIORITY?
YES
NO
S13
BROADCAST INFORMATION IS DIVIDED INTO A PLURALITY OF GROUPS OF INFORMATION
A FRAGMENT, IN WHICH THE BROADCAST INFORMATION WITH HIGH PRIORITY AND A PART OF THE DIVIDED BROADCAST INFORMATION WITH LOW PRIORITY ARE COMBINED WITH EACH OTHER, IS PREPARED, AND THE OTHER PART OF THE DIVIDED BROADCAST INFORMATION WITH LOW PRIORITY IS TEMPORARILY STORED.
S14
BROADCAST SCHEDULE IS CREATED.
S15
S16
NO
HAS ENTIRE BROADCAST INFORMATION BEEN PROCESSED?
YES
END

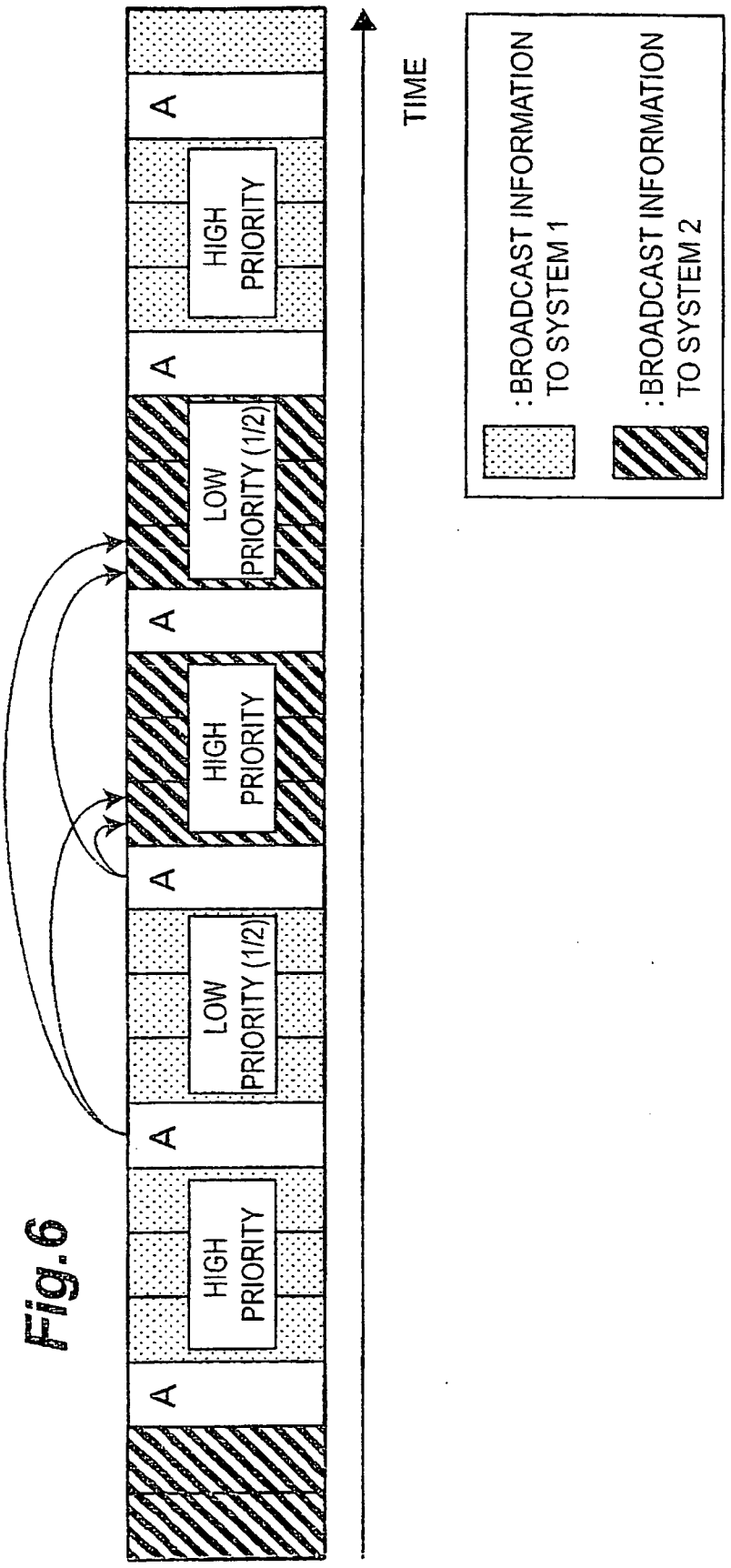

A
HIGH PRIORITY
A
LOW PRIORITY (1/2)
A
HIGH PRIORITY
A
LOW PRIORITY (1/2)
A
HIGH PRIORITY
A
TIME
: BROADCAST INFORMATION TO SYSTEM 1
: BROADCAST INFORMATION TO SYSTEM 2

Fig.6

Fig.7

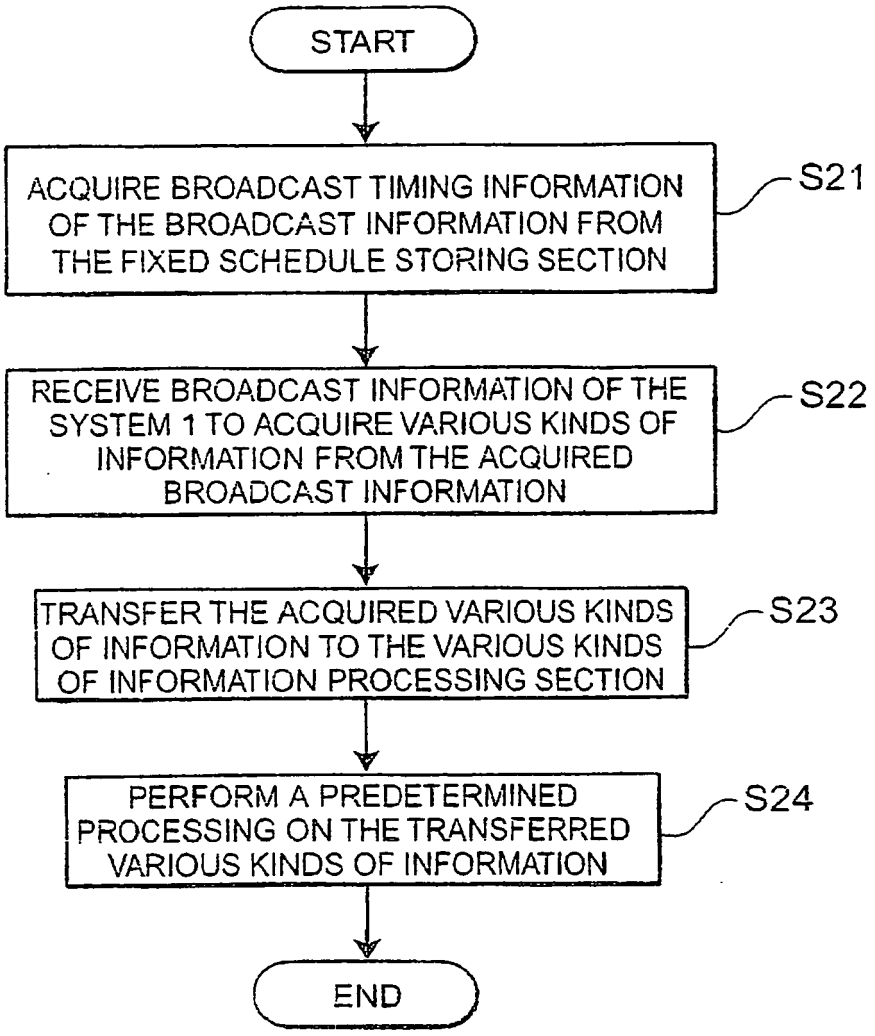
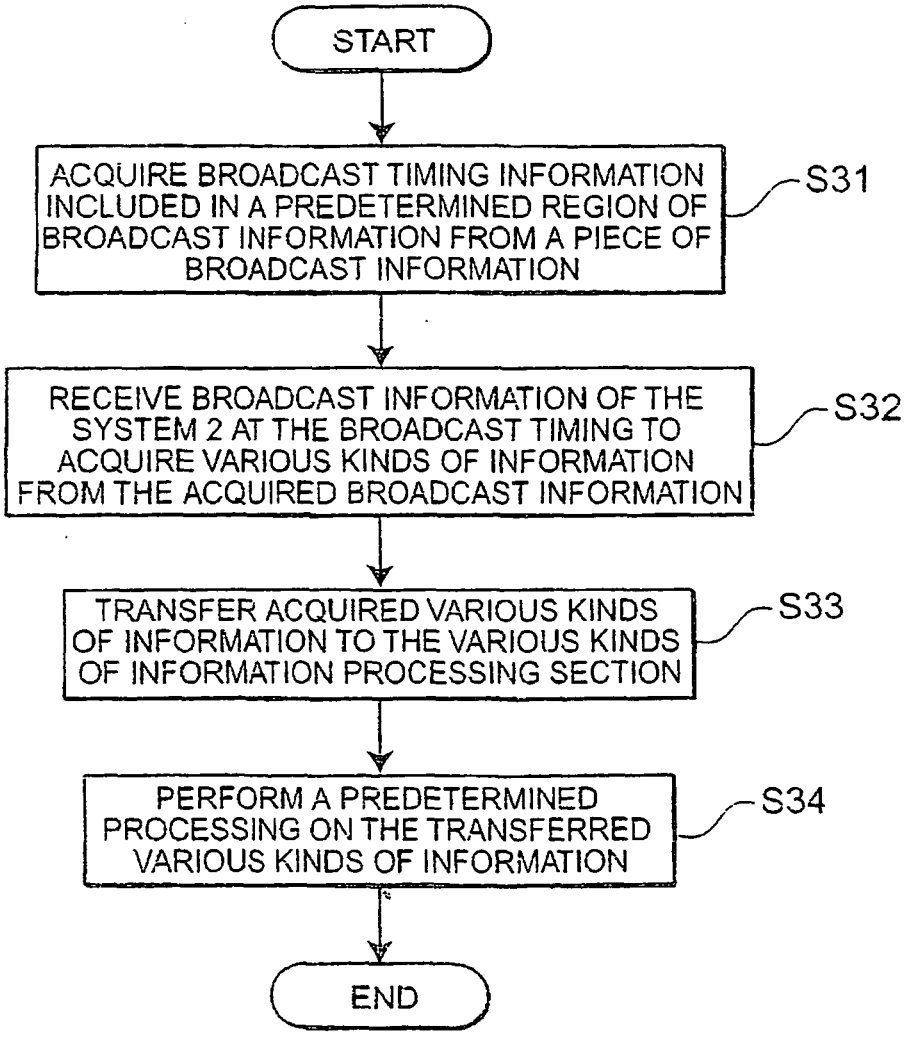

START
ACQUIRE BROADCAST TIMING INFORMATION OF THE BROADCAST INFORMATION FROM THE FIXED SCHEDULE STORING SECTION
S21
RECEIVE BROADCAST INFORMATION OF THE SYSTEM 1 TO ACQUIRE VARIOUS KINDS OF INFORMATION FROM THE ACQUIRED BROADCAST INFORMATION
S22
TRANSFER THE ACQUIRED VARIOUS KINDS OF INFORMATION TO THE VARIOUS KINDS OF INFORMATION PROCESSING SECTION
S23
PERFORM A PREDETERMINED PROCESSING ON THE TRANSFERRED VARIOUS KINDS OF INFORMATION
S24
END

Fig.8


START
ACQUIRE BROADCAST TIMING INFORMATION INCLUDED IN A PREDETERMINED REGION OF BROADCAST INFORMATION FROM A PIECE OF BROADCAST INFORMATION
S31
RECEIVE BROADCAST INFORMATION OF THE SYSTEM 2 AT THE BROADCAST TIMING TO ACQUIRE VARIOUS KINDS OF INFORMATION FROM THE ACQUIRED BROADCAST INFORMATION
S32
TRANSFER ACQUIRED VARIOUS KINDS OF INFORMATION TO THE VARIOUS KINDS OF INFORMATION PROCESSING SECTION
S33
PERFORM A PREDETERMINED PROCESSING ON THE TRANSFERRED VARIOUS KINDS OF INFORMATION
S34
END

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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